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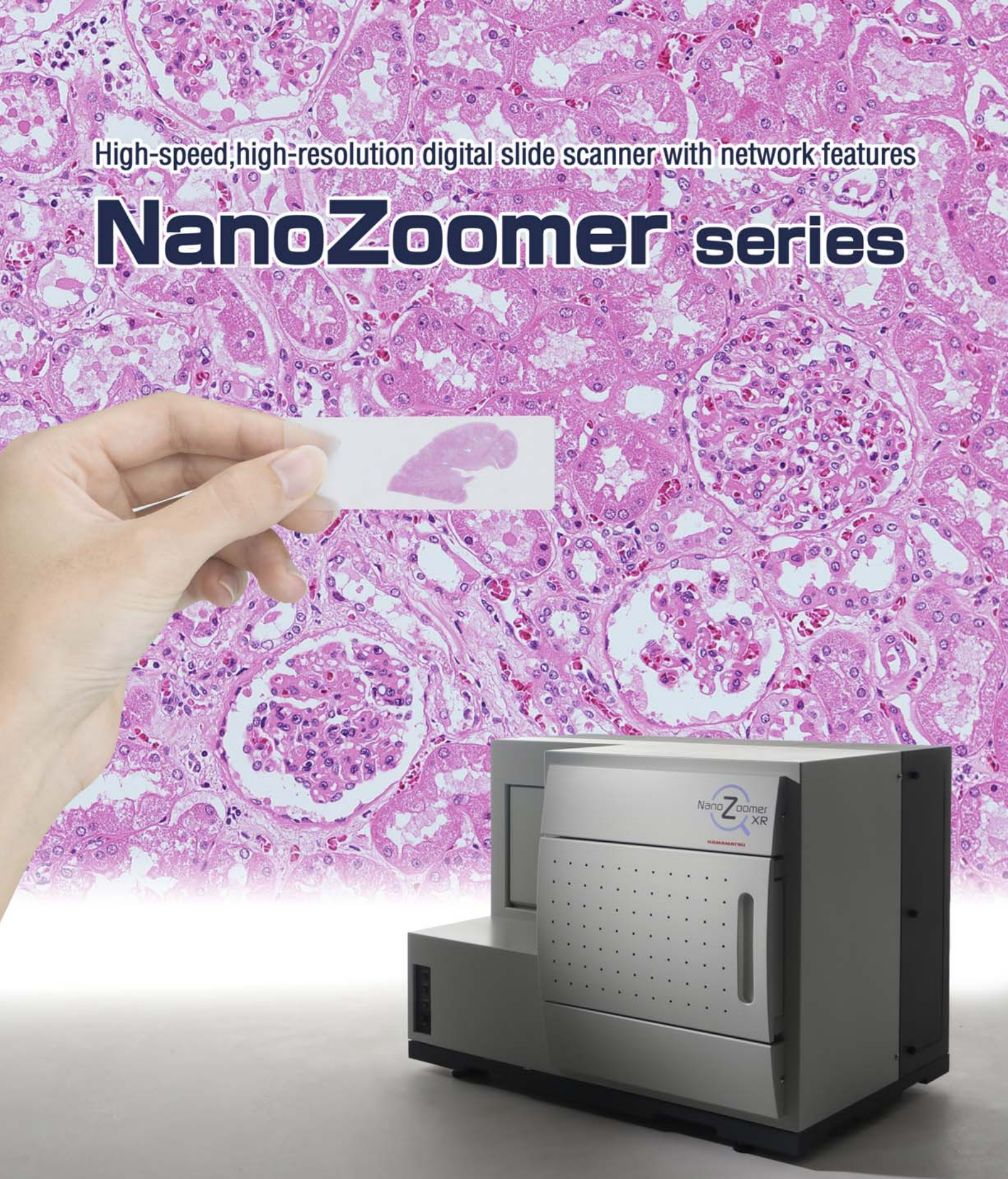
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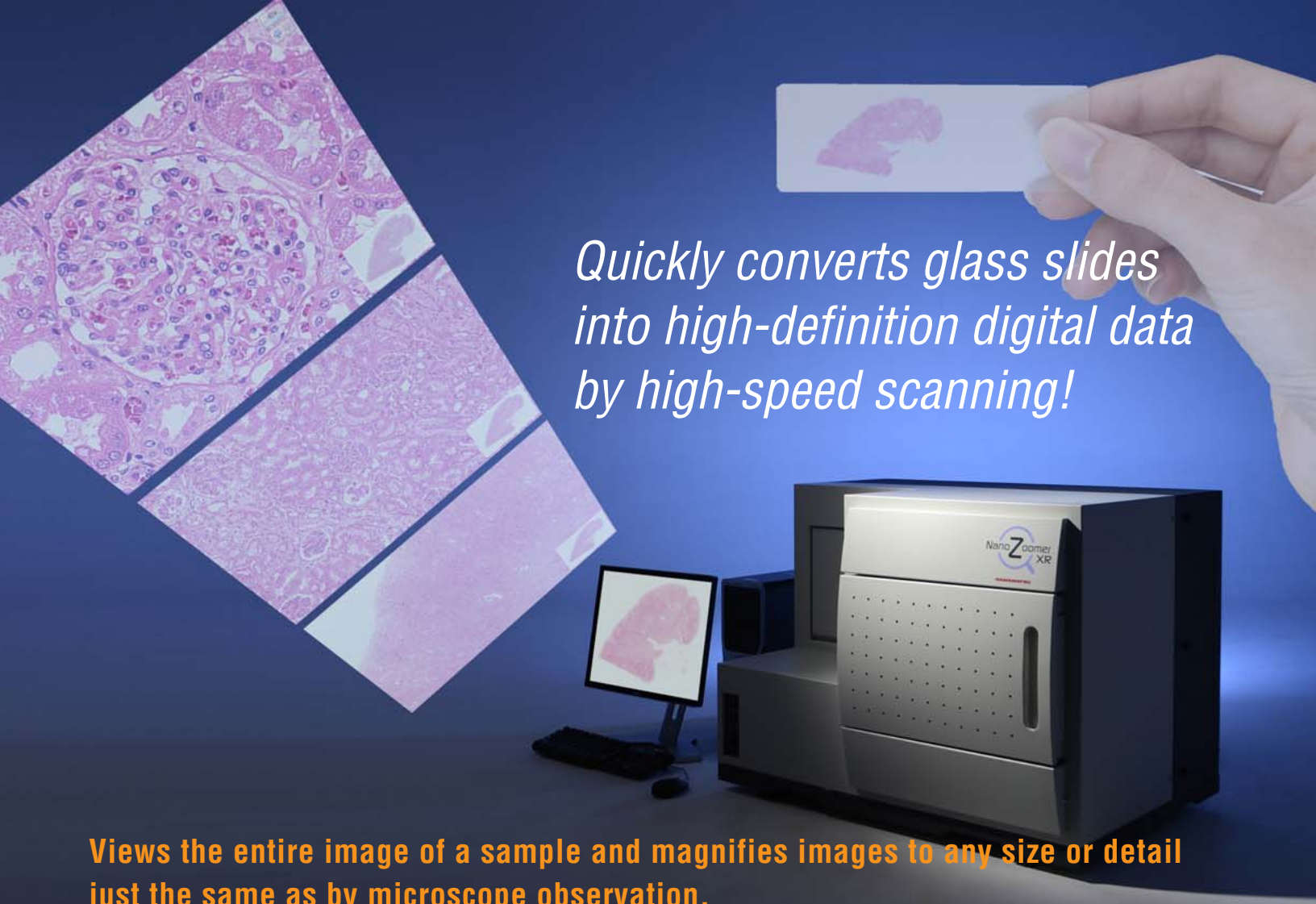
High-speed,high-resolution digital slide scanner with network features

NanoZoomer series



HAMAMATSU

PHOTON IS OUR BUSINESS



Quickly converts glass slides into high-definition digital data by high-speed scanning!

Views the entire image of a sample and magnifies images to any size or detail just the same as by microscope observation.

The NanoZoomer Series is a family of digital slide scanners that convert glass slides into high-resolution digital data by high-speed scanning. The NanoZoomer comes with a variety of functions such as image acquisition of fluorescence samples and multilayer acquisition. Scanned data can be viewed on a PC monitor by using the dedicated viewer software, and patented navigation map technique* delivers slide viewing environment just as if operating a microscope.

*US Patent RE42,220E

Digital slides have many advantages! Digitizing slides opens up a variety of new possibilities.

Copying and Sharing

Digitized slides can be copied and shared. This feature of digital slides can be used in a variety of applications. For example, a large group of people can observe and discuss a single sample.

Slide Storage

Digital data does not deteriorate, and it is more secure from damages and losses than glass slides. You can view digital data in its original quality anytime and anywhere.

Databases

Large numbers of digital slides can be stored into a database and incorporated into a laboratory information system. You can share data and construct slide libraries with distant facilities and research institutes.

Networks

Using the Internet or a local area network, you can observe and evaluate slides from a distant location.

* The NanoZoomer series as medical devices may be subject to government regulations where they are used. Hamamatsu makes no representation with regard to the conformity of these products to these regulations. Please consult your local Hamamatsu representative for more information.

High-end model

NanoZoomer -XR

XR



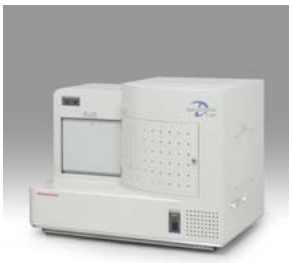
Comes with rapid automatic processing of up to 320 slides, dynamic focus, and image quality judgment functions

The NanoZoomer-XR is the next generation of digital slide scanners that delivers rapid yet high-quality scanning and also easy operation via automatic control. It quickly processes a huge volume of slides and the auto focus judgment function detects all types of scanning errors.

Standard model

NanoZoomer 2.0 -HT

HT



Automatic processing of up to 210 slides and a solid history of stable performance

The NanoZoomer 2.0-HT is a user-friendly scanner designed to process up to 210 slides automatically. Just set the slides and press the start button, and all tasks from transferring the samples to acquiring their images are performed automatically. Since its launch on the market the NanoZoomer 2.0-HT has earned itself a high reputation from our many users.

Compact model

NanoZoomer 2.0 -RS

RS



Automatically process up to 6 slides of regular size or 2 slides of double size

The NanoZoomer 2.0-RS is compact and affordable. It maintains the performance of the NanoZoomer 2.0-HT except for the number of slides processed automatically. It processes up to 6 slides of regular size (76 mm × 26 mm) or 2 slides of double size (76 mm × 52 mm) automatically.
(The processing of double size slides is an optional feature.)

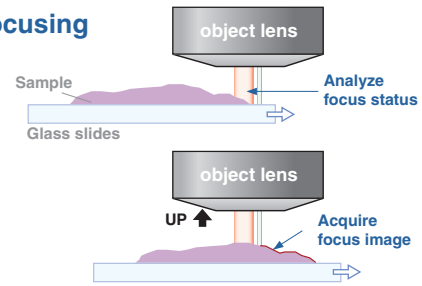
Newly installed scan function

XR

This function delivers high-quality scanning along with smooth and easy operation. It is incorporated only into our top-end model - the NanoZoomer-XR.

Sharp focus on entire specimen: Dynamic Pre-Focusing

The NanoZoomer-XR uses its unique Dynamic Pre-Focusing method (patent pending) to track and keep specimens in focus while scanning. It analyzes focus status right before capturing an image and adjusts the objective lens to focus the image in real time. It keeps sharp focus on the entire specimen to generate high quality digital slides even from specimens which are difficult for the traditional focus mapping method.



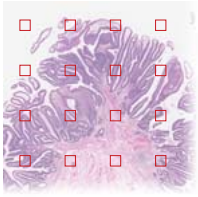
Focus status is analyzed right before imaging in real time.

▼

The focus status is used to control an objective lens in real time to acquire focused image.

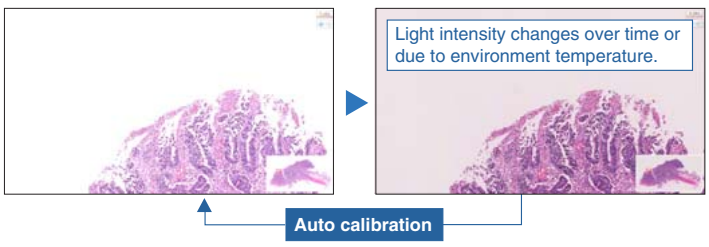
Free from time consuming manual slide quality check: Automatic focus scoring

Manual slide quality check is often conducted after scanning to avoid scanning failure caused by dirt on a slide or sample folding. The NanoZoomer-XR evaluates scanned digital slides automatically and generates a focus score of each slide's quality for your review. Focus check points within a scanned slide are automatically determined, at each check point, focus is analyzed. Then a focus score is generated and displayed on a monitor screen. This score can be used for automated rescan.



Optimized system condition whenever you scan: Automatic system calibration

To maintain optimized condition of the scanner, routine calibrations of light intensity, white balance and shading are required. The NanoZoomer-XR automatically and periodically conducts a system calibration using a calibration slide located in a slide cassette, and keeps the system optimized. Whenever you scan, you will get the best digital slides it can deliver.



NanoZoomer series scan principle

The scan units in the NanoZoomer Series employ "line scan" and "TDI mode" to scan sample tissues on glass slides at high speed and convert them into high-definition digital images.

TDI mode line scan

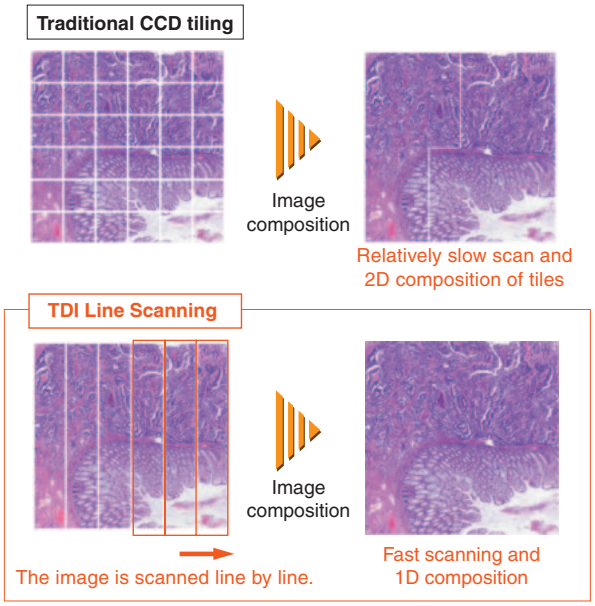
XR HT RS

Variety of superior scan features from the expertise of Hamamatsu sensor technology.

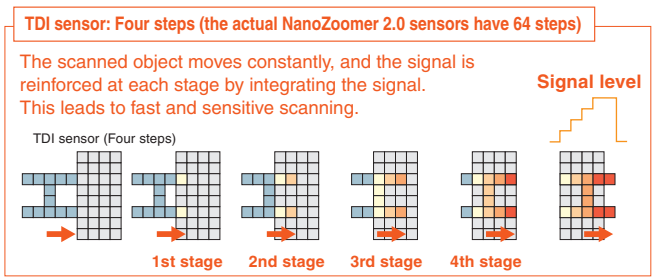
TDI combines both high speed and high sensitivity

The NanoZoomer series uses time delay integration (TDI) to provide high speed and high sensitivity simultaneously. Hamamatsu technology allows synchronizing TDI sensor signal with the movement of a microscopic sample object being scanned.

■ Line scanning makes scanning faster



■ Unique TDI sensors realizes both high sensitivity and high speed simultaneously



3-chip TDI camera provides superior color reproduction

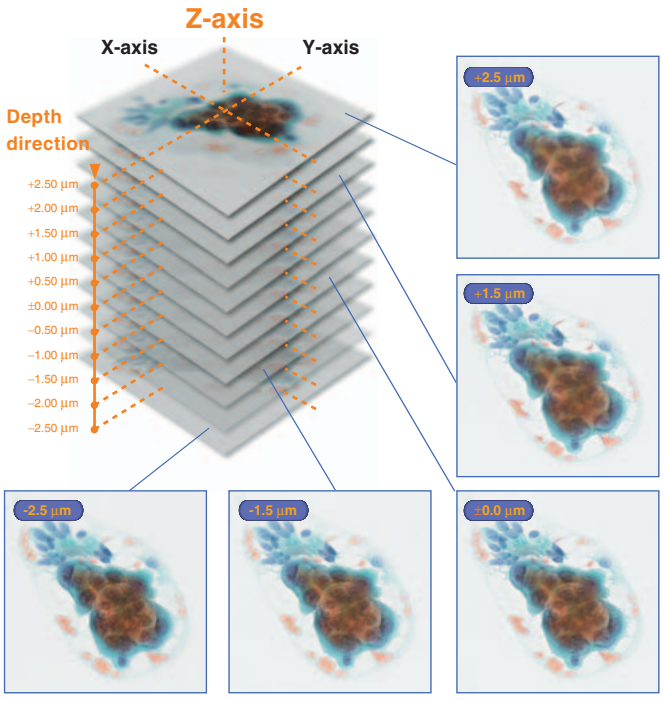
The NanoZoomer series uses a 3-chip TDI camera to accurately reproduce sample colors. It enables observing minute variations in the colors of the sample. The 3-chip TDI camera has red, green and blue channels, and they are used to produce a single RGB image.

Dedicated system design makes the NanoZoomer series user friendly and highly reliable.

The NanoZoomer series is a specialized machine designed for routine use. It is user friendly and highly reliable. It employs a variety of sensors monitoring mechanical operations to ensure the safety of your slides.

Z-stack feature for thick samples

There are samples which have 3D structures such as clumps of cells and thick tissues. They require focus adjustment during observation. To handle these kinds of slides, the NanoZoomer series is equipped with the Z-stack feature that allows you to focus on different depths in the sample.
The NDP.view2 viewer software lets you adjust the focus on a Z-stack slide much like you would adjust the focus of a microscope. You can also point to an area of interest and let NDP.view2 apply autofocus for maximum clarity.



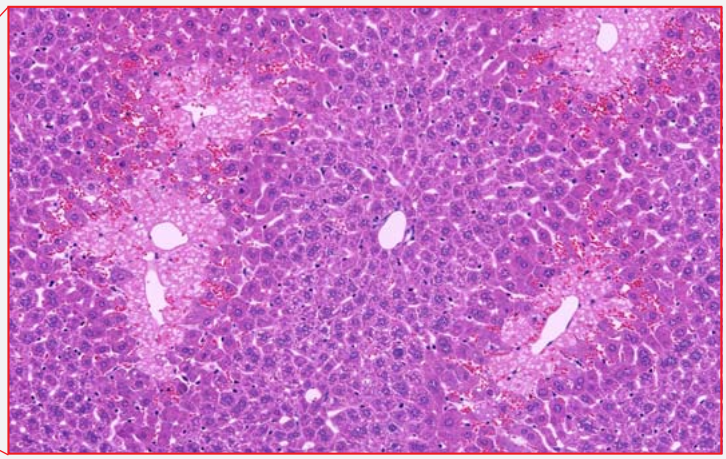
Examples

Toxicity test using H&E staining

NanoZoomer is available for a wide range of applications including toxicity evaluation.



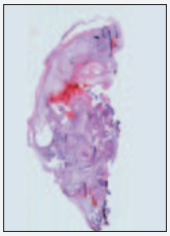
▲ Liver in mouse with a dose of acetaminophen in 4 hours (Whole Image)

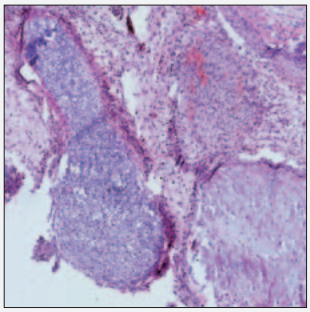


▲ Liver in mouse with a dose of acetaminophen in 4 hours (Magnified Image)
Provision of Glass Slide
Courtesy of Dr.June Kanno Division of Toxicology, Biological Safety Research Center, National Institute of Health Sciences, Japan

Application for iPS cells research

NanoZoomer is great for testing iPS cell differentiation ability by observation of teratoma tissue samples ranging from overall views to high-magnification images.

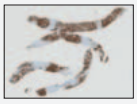


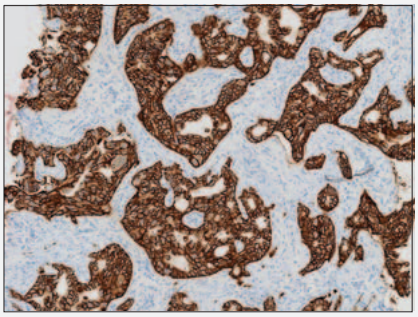


▲ Teratoma formation by using mouse iPS cells (HE-stain).
Courtesy of Center for iPS Research and Application, Kyoto University

Protein localization analysis using immunostaining

NanoZoomer is ideal for observing localization of various types of proteins by using immunostaining techniques and so opens a host of diverse new applications.

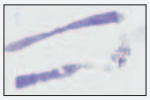


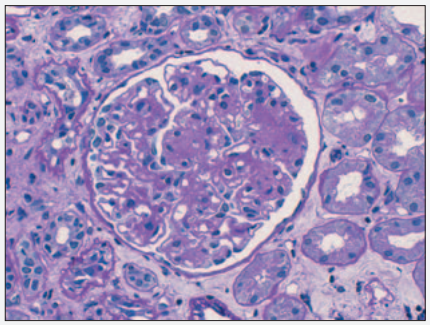


▲ Specimen of needle biopsy stained by IHC(HER2)
Courtesy of Dr.Kurozumi M, the Department of Pathology, Saitama Cancer Center, Japan

Conferences using digital slides

With digital slides, you can share the same sample among many people without worrying about sample deterioration.

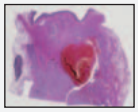


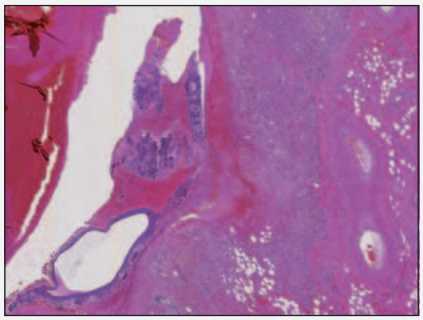


▲ PAS stained kidney biopsy sample
Courtesy of Department of Pathology, The University of Tokyo Hospital, Hiroshi Uozaki, M.D., Ph.D.

Observing H&E stained samples

This is the basic staining method for tissue samples and is widely used for pathological examinations and tissue anatomy.





▲ Pancreatic AVM with anisakiasis, resulting in pancreatic bleeding
Courtesy of KobeCity Medical Center General Hospital, Department of Pathology, Yukihiro Imai, MD Ph.D.

Option

Fluorescence imaging modules L12225 / L11600

Digitization of fluorescence samples enables long-term observation with no worries about fading, discoloration, or photobleaching.

The Fluorescence Imaging Modules combined with the NanoZoomer Series are able to scan the entire image of fluorescence-stained samples at high speed and high resolution. The scanned images are saved as digital data which allows long-term observation without photobleaching which has been a difficult problem on conventional fluorescence microscopes. These modules also permit flexible observation of the overall sample image as well as the magnified or reduced images. The L12225-02 and L11600-21/-22 come supplied with a filter wheel that automatically select and switches 6 filters for excitation and fluorescence wavelengths to sequentially acquire multiple fluorescence images. The L12225-01 and L11600-11/-12 support fluorescence scanning in single, double and triple bands by simply replacing the filter cube. All models of the Fluorescence Imaging Modules use the L11600-05 light source optimized for fluorescence microscopes that features high power, high stability, and long service life.



NanoZoomer-XR + L12225-01/-02



NanoZoomer 2.0-HT + L11600-11/-21



NanoZoomer 2.0-RS + L11600-11/-12/-21/-22

Features of fluorescence imaging modules XR HT RS

Adding a Fluorescence Imaging Module captures a diverse range of fluorescence images

Scans samples stained with multiple fluorescence probes

The Fluorescence Imaging Modules scan and generate digital data for samples stained with multiple fluorescence probes such as Q-dots, fluorochromes, fluorescence proteins, and others. The filter wheel unit automatically selects and switches 6 filters for excitation and fluorescence wavelengths to allow sequential image acquisition at single or multiple wavelengths.

Superimposes images of entire tissues

The Fluorescence Imaging Modules can superimpose a bright field image and a fluorescence image or superimpose two or more fluorescence images at tissue levels. This allows observing target protein localization and expression levels across the entire image.

Uses high-power and long-life light source that needs no optical axis alignment

The Fluorescence Imaging Modules use the L11600-05 light source optimized for fluorescence microscopes. It offers an extremely long service life of 2000 hours as well as high power and high stability. No optical axis alignment is required even when the lamp is replaced.

Uses dark field illumination for sample identification

Fluorescence sample locations on a slide are usually difficult to find using transmitted illumination, so the Fluorescence Imaging Modules use dark field illumination* to pinpoint sample locations. This makes it easy to extract samples of interest.

*Patent registered

Features highly efficient optics ideal for TDI sensors

To improve excitation light level density, the Fluorescence Imaging Modules efficiently condense a light flux onto the elongated area on a TDI line sensor that activates in transfer integration mode. This allows capturing even very weak fluorescence at high speed and also reduces the effect of photobleaching on samples since no excitation light is irradiated onto unwanted areas.

Fluorescence module specifications

Products number	L12225-01	L12225-02	L11600-11	L11600-12	L11600-21	L11600-22
Applicable model	XR	XR	HT/RS	RS	HT/RS	RS
Light source	L11600-05*1 200W Ultrahigh-pressure mercury lamp					
Number of filter cubes installed*2	3	3	1	2	1	2
Filter wheel	-	6Ex/6Em	-	-	6Ex/6Em	6Ex/6Em

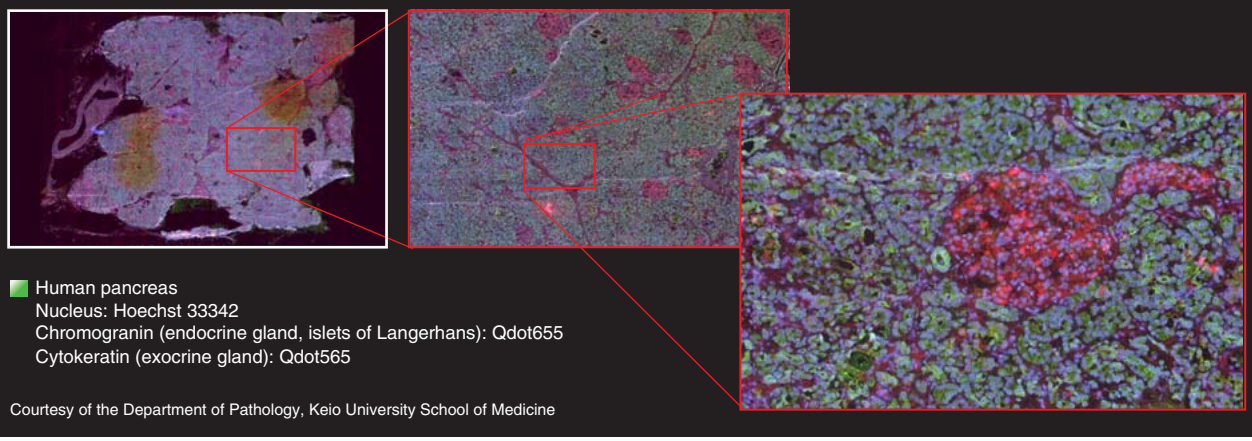
*1 See the table below for L11600-05 specifications.
*2 Filter cubes and filters are sold separately. Please consult us.

FL-illumination lamp unit L11600-05 specification

Dimensional outline / Weight	180 mm(W) × 299 mm(D) × 227 mm(H) Approx. 6.8 kg
Power consumption	300 VA

Examples

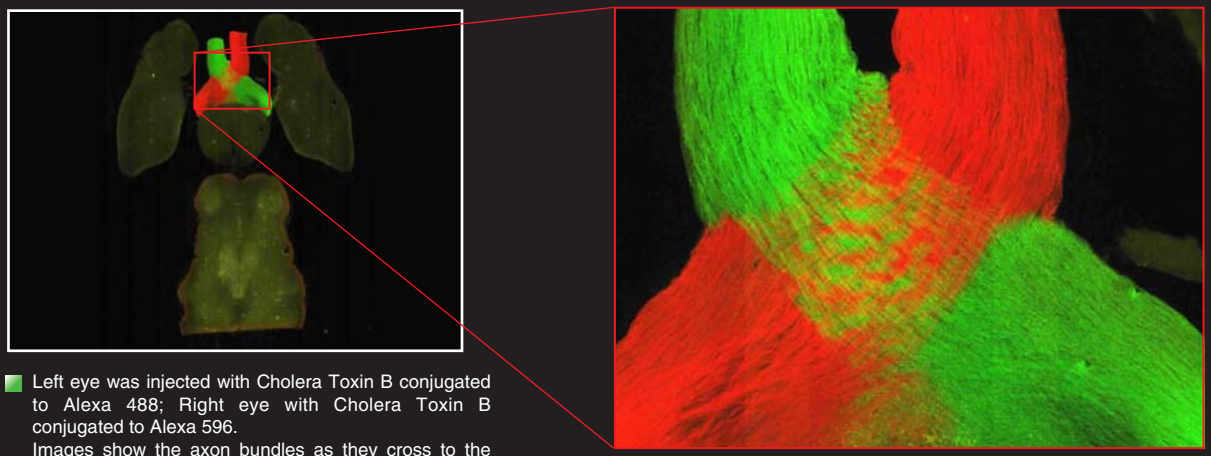
Rapid and High-Fidelity Imaging of Fluorescence-Labeled Q-dots



Human pancreas
Nucleus: Hoechst 33342
Chromogranin (endocrine gland, islets of Langerhans): Qdot655
Cytokeratin (exocrine gland): Qdot565

Courtesy of the Department of Pathology, Keio University School of Medicine

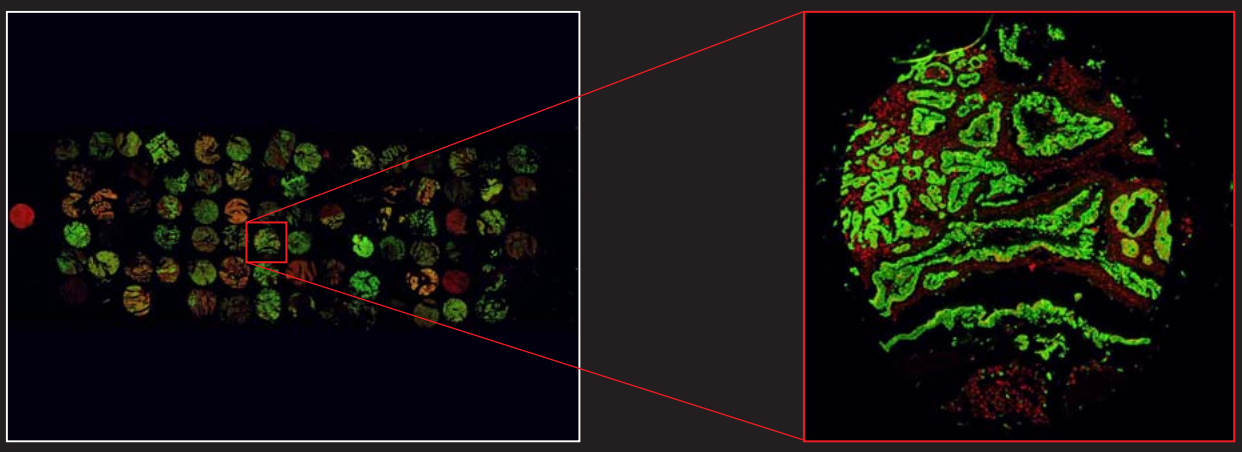
Horizontal Section of the Nile Rat Brain Showing the Crossing of Retinal Axons in the Optic Chiasm



Left eye was injected with Cholera Toxin B conjugated to Alexa 488; Right eye with Cholera Toxin B conjugated to Alexa 596.
Images show the axon bundles as they cross to the opposite sides of the brain.

Courtesy of the Harvey Karten, University of California-San Diego, USA; Yves Sauve, University of Alberta, Canada; Frederic Gaillard, Universite de Poitiers, Poitiers, France

Observing multi-wavelength fluorescence image of TMA



TMA images were acquired in the course of joint research with the National Cancer Center Research Institute, Department of Chemotherapy and Department of Pathology.

Specifications

Product name		NanoZoomer-XR	NanoZoomer 2.0-HT	NanoZoomer 2.0-RS
Product number		C12000	C9600	C10730
Scanning method		TDI (Time Delay Integration)		
Scanning speeds	20× mode (15 mm ×15 mm)	Approx. 35 s	Approx. 60 s	Approx. 60 s
	40× mode (15 mm ×15 mm)	Approx. 45 s	Approx.150 s	Approx. 150 s
Objective lens		20× (NA 0.75) User can select 20× or 40× mode at start of scanning.		
Scanning range		26 mm × 76 mm	26 mm × 76 mm	26 mm × 76 mm 52 mm × 76 mm (Option)
Slide loader		Automatic, max. 320 slides	Automatic, max. 210 slides	Standard size: 6 slides, Double size: 2 slides
Scanning resolution	20× mode	0.46 µm		
	40× mode	0.23 µm		
Focusing method		Dynamic Pre-Focus Pre-Foucus map	Pre-Foucus map	Pre-Foucus map
Z-stack feature		Acquires Z-stack images over entire scan area		
Fluorescence imaging module		Option		
Barcode reader		1D barcode (standard feature), 2D barcode (option)		
Image compression		JPEG compression		
Slide format		JPEG compressed image + slide information		
Power supply voltage		AC 100 V to AC 240 V		
Power consumption		300 VA	400 VA	

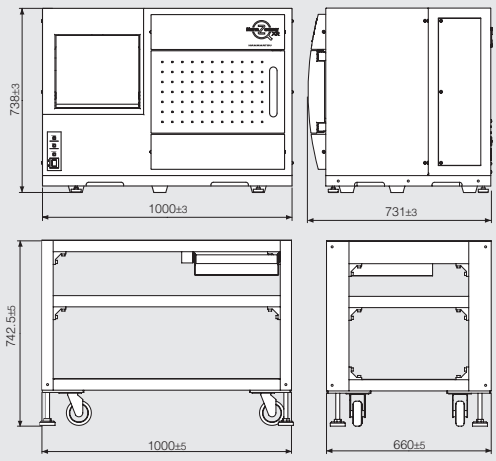
Dimensional outlines

(Unit: mm)

■ **NanoZoomer-XR C12000**

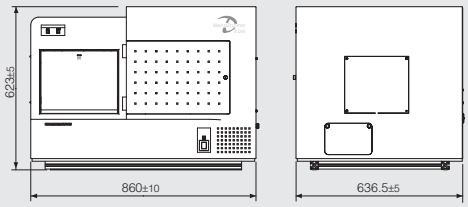
(Dedicated rack supplied as standard equipment)

Weight Main unit: Approx.142 kg, Dedicated rack: Approx. 67 kg



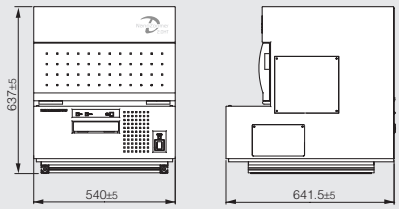
■ **NanoZoomer 2.0-HT C9600**

Weight Approx. 94 kg



■ **NanoZoomer 2.0-RS C10730**

Weight Approx. 72 kg



* The NanoZoomer series as medical devices may be subject to government regulations where they are used. Hamamatsu makes no representation with regard to the conformity of these products to these regulations. Please consult your local sales representative for more information.

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China: Hamamatsu Photonics (China) Co., Ltd.: B1201 Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: hpc@hamamatsu.com.cn

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